

TABLE 4.—Observations by means of kites, captive and limited-height sounding balloons during August, 1930

	Broken Arrow, Okla.	Due West, S. C.	Ellen- dale, N. Dak.	Groes- beck, Tex.	Royal Center, Ind.
Mean altitudes (meters), m. s. l., reached during month.....	2, 755	2, 576	2, 866	1, 873	3, 058
Maximum altitude (meters), m. s. l., reached and date.....	1 4, 381	2 4, 641	3 6, 525	4 2, 366	5 8, 201
Number of flights made.....	29	31	31	20	27
Number of days on which flights were made.....	29	31	31	20	27

¹ 20th. ² 18th. ³ 24th. ⁴ 31st. ⁵ 26th; captive balloon breakaway; next highest flight at Royal Center was a kite flight to 6,130 meters on the 21st.

In addition to the above there were approximately 130 pilot balloon observations made daily at 56 Weather Bureau stations in the United States.

WEATHER IN THE UNITED STATES

THE WEATHER ELEMENTS

By M. C. BENNETT

GENERAL SUMMARY

The weather for August was extremely hot almost everywhere during the first decade, but as it ended cool weather overspread the central and northern districts, and light frosts were reported on the 13th in southern New York, western Pennsylvania, and West Virginia. During the remainder of the month the weather was cool in most sections from the Rocky Mountains eastward, except temperatures above normal prevailed in the western Great Plains and northwestern Rocky Mountain areas. The month as a whole was warmer than normal except in northern New England, New Jersey, West Virginia, the South Atlantic States, and the far Southwest.

While moderate to substantial showers were received over limited areas during the month, which relieved the severe droughty conditions in some sections, the month generally had very scanty rainfall, and the severe drought remained largely unbroken. The deficiencies in precipitation for the month were widespread, with every State east of the Rocky Mountains, except South Dakota and Nebraska, receiving less than normal. The areas of greatest deficiency for the month were in the Northern and Southeastern States, where droughty conditions had not been so generally severe during July. The least rainfall of August record was received this month in Minnesota, Pennsylvania, Maryland, and Virginia.

TEMPERATURE

While marked changes occurred in most sections, yet August, as a whole, was considerably hotter than normal. The first decade temperature, especially, was a continuation of the situation of the latter half of July, all districts save a few southwestern, southeastern, and northeastern having temperatures moderately to decidedly above normal.

The middle of the month was notable for cool weather for summer in a great many regions, yet the Plains States and the Northwest remained decidedly hot. The first half of the final decade was cool in the eastern half of the country, but hot over most of the western half, especially in the northern Rocky Mountain region. The last few days of the month were hotter than normal over nearly all the country, especially from the upper Mississippi Valley eastward to the Middle Atlantic States.

August averaged cooler than normal only near the Atlantic and east Gulf coasts and in the southern Appalachian region, and over considerable portions of California, Arizona, and Nevada. In other regions the month averaged warmer than normal, and generally from 2° to 5° warmer in the northern Rocky Mountain region, the

Missouri and upper Mississippi Valleys, and the upper Lake region. In North Dakota the month was as hot as any preceding August of record.

In all States east of the Mississippi River, and in almost all Middle and Northern States to westward, the highest temperatures occurred during the first decade, very often on either the 2d, 3d, or 4th. In most States which touch either the Mississippi or the Ohio River, and in several Middle Atlantic States, the highest marks of previous August records were exceeded or equaled or very closely approached. In Tennessee 113°, on the 9th, was 5° above any mark of an earlier August, and in Minnesota 109°, on the 3d, was 4° above.

In the northern and middle portions of the eastern half of the country, the drop in temperature near the end of the first decade was very pronounced, and the lowest readings of the month were noted about the 10th to 14th. In West Virginia, 112° had been recorded on the 4th, 2° above any previous state record; but only eight days later other places in the State noted 30°, 1° below any other August record.

In most of the cotton States, and most States of the western half of the country, the lowest readings of the present August occurred chiefly on or after the 20th, and only in the South Atlantic States were they noteworthy in comparison with what earlier Augusts had brought.

PRECIPITATION

Scanty precipitation, particularly over the eastern half of the country, was once more a conspicuous feature. East of the ninety-fifth meridian not one of the States received a normal amount of rainfall, and nearly one-third of them received less than 40 per cent of the normal. The scarcity of August precipitation was very marked in the more elevated portions of Georgia and South Carolina, in the interior sections of the Middle Atlantic States, and from Michigan to Minnesota.

Among the districts which had suffered great scarcity of moisture during July, the Ohio and lower Mississippi Valleys received mainly about two-thirds of the normal August quantities, so conditions improved somewhat. However, the distribution within the States was poor, also the important rains seldom came till about the middle of the month, when the possibility of benefit to staple crops had become less than it was at the close of July.

This summer has been the driest within the period well covered by records from Arkansas and Mississippi northeastward to the southern Middle Atlantic States. In Arkansas the summer June to August, brought about one-third the normal precipitation. In Kentucky the sixth months, March to August inclusive, were all deficient in precipitation, the whole period showing not quite half

the normal quantity. Several other States have been almost as unfortunate as these two.

The western half of the country received more nearly its normal precipitation during August, in fact from Nevada and northern Arizona northeastward to the middle Missouri Valley there was more than normal, particularly in southern, central, and western Wyoming and southeastern Idaho. In Wyoming it was considerably the wettest August of record.

The western districts near the Canadian boundary mainly had less rain than normal, and the same was true of the southern half of the Plains of New Mexico, save the western part, and of nearly all of Texas, especially the southern part.

SUNSHINE AND RELATIVE HUMIDITY

Much sunshine prevailed during the month throughout the country except in northeastern New England, a small area in the central Great Plains, and the northern

Pacific area, where less than 40 per cent of the possible was observed. However, in portions of the upper lake region, the western portions of Kansas, Oklahoma, and Texas, and from western Texas to the Pacific, except a small area in southwestern California, most localities received more than 70 per cent of sunshine, while southwestern Arizona and the eastern and central portions of California received from 81 to 94 per cent of the possible amount for the month.

The extreme droughty conditions that prevailed over the country as a whole are reflected by the humidity percentages, which, over much of the country are found to be below the normal, the deficiencies ranging up to as great as 25 per cent in some sections of the Southeast. On the other hand, the humidity percentages were above the normal in portions of northern New England, the central Great Plains and the Rocky Mountain and Plateau regions, where the severe droughty conditions did not prevail.

SEVERE LOCAL STORMS, AUGUST, 1930

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yards ¹	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Ipswich to Aberdeen, S. Dak.	1	3:30 p. m.			\$13,000	Wind and hail	Buildings damaged or wrecked; crops ruined	Official, U. S. Weather Bureau.
Antreville (near), Calhoun Falls and Abbeville, S. C.	1	10:30 p. m.	2 mi.		35,000	Hail	Crops and other property on 3,000 acres damaged.	Do.
Crown Point, N. Mex.	1					Severe electrical and hail.	Character of damage not reported.	Do.
Woodruff, S. C.	1				4,000	Hail	Crops damaged.	Do.
Durand, Wis.	2	11:30 a. m.	6 mi.		4,000	Hail and rain	Many windows broken; roofs damaged; crops injured; main streets flooded.	Do.
Huron, S. Dak.	2	4:50 p. m.	50		3,000	Wind	Buildings damaged.	Do.
Beadle County, S. Dak.	3	6-7 p. m.			12,000	Wind and hail	Buildings and crops damaged over small area.	Do.
Castleford to Buhl, Idaho.	3				25,000	Electrical and hail.	House and auto burned; severe crop damage.	Do.
Morrison, Colo.	4	12:30 p. m.	2 mi.		7,000	Hail	Crops, roofs, and auto tops considerably damaged.	Do.
Parker, Colo.	4	5 p. m.	1-2 mi.			do.	Character of damage not reported.	Do.
Loganville Wis. (near)	4				8,000	Electrical	Barn and other small buildings wrecked.	The Wisconsin State Journal (Madison, Wis.).
Westlake to Kooskia, Idaho.	4					Hail and wind	300,000 bushels of grain ruined.	Official, U. S. Weather Bureau.
Marble Falls, Tex.	5	4:30 p. m.	1,320		25,000	Tornado	Roof of factory destroyed.	Do.
Scandia (near) to Rydal (near), Kans.	5	6 p. m.	2,500		10,000	Hail	About 1,000 acres of corn badly damaged; path 5 miles long.	Do.
Tatum and Minden, Tex.	5	6:30 p. m.	880		3,000	Wind	Some damage to buildings and crops.	Do.
Dubuque, Iowa	5				7,000	Wind, rain and electrical.	Several residences and barns fired by lightning.	Do.
Aberdeen, S. Dak.	6	4:45 p. m.			3,000	Wind	Overhead wires damaged.	Do.
Monroe County, Iowa	6	5:30 and 7 p. m.			3,200	Two wind and hail storms.	No details reported.	Do.
Wayne and Jasper Counties, Iowa.	6	5:30 and 6:30 p. m.			6,500	Two wind storms.	do.	Do.
Polk County, Iowa.	6	6 p. m.			8,200	Wind and hail.	do.	Do.
East Hartford Conn., and vicinity.	7	P. m.				Rain, hail and wind.	Chief damage to tobacco and fruit.	Hartford Courant (Conn.).
Monetta, S. C.	8				1,000	Wind squall	Barn wrecked; a mule and two cows killed.	Official, U. S. Weather Bureau.
Mount Carroll, Ill., and vicinity.	9	11-11:30 a. m.	830-1,760		2,500	Hail	Chief damage to crops, roofs, and glass; trees blown down; path 18 miles long.	Do.
Athens, Ill.	9	3 p. m.			3,000	Wind	Buildings damaged; corn flattened.	Do.
Beardstown, Ill.	9	4 p. m.				Wind and hail.	Crops, gardens, and roofs damaged.	Do.
Joliet, Ill.	9	do.			20,000	Wind and rain	Wire services impaired; several houses unroofed.	Official, U. S. Weather Bureau.
Lyons, Nebr. (2 miles south).	9	6 p. m.	1,760		75,000	Hail	Severe crop loss; path 10 miles long.	Do.
Louisville, Ky., and vicinity.	9	8 p. m.		1	50,000	Wind and severe thunderstorm.	Heavy property damage in the city; a number of planes damaged at Bowman Field; several persons injured.	Do.
Chester, S. C. (near)	9	9:30 p. m.			4,000	Electrical	Large barn struck; contents and 5 mules burned.	Do.
Fort Wayne, Ind.	9				1,500	Wind	Trees blown down; telephone and traction service impaired.	Do.
Greensboro, N. C.	9		2 mi.			Thunderstorm and wind.	Trees broken; crops beaten; streets flooded; path 5 miles long.	Do.
Clinton, Scott, Grundy, Jackson, Linn, Montgomery, Page, and Woodbury Counties, Iowa.	9	P. m.			28,000	Wind and hail	Crops and other property damaged.	Do.
La Salle, De Pue, and Princeton, Ill., and vicinity.	9			2		Wind	Trees down; corn flattened; roofs and signs damaged; electric services interrupted; boat capsized.	Do.
Royal Center, Ind., and vicinity.	9					do.	Fruit trees injured; buildings and crops damaged.	Do.
Vincennes, Ind.	9				1,000	do.	Wires and trees damaged.	Do.
Cowpens, S. C.	10	P. m.			15,000	Electrical	Power house struck.	Do.
Hicksville to Riverhead, Long Island, N. Y.	10				17,000	Rain, wind, and probably small tornado.	Much injury to crops, buildings, and trees; planes damaged; tornado near Hicksville.	Do.
Providence, R. I.	10	A. m.			8,400	Thunderstorm	Buildings damaged.	Do.
Oklaha, Okla., (5 miles southeast).	11	4 p. m.	440		2,500	Hail	Chief damage to crops; path ¾ mile long.	Do.

¹ "Mi." signifies miles instead of yards.